

We claim:

1. An expandable stent that is capable of being crimped onto a delivery device, the stent comprising a main body having a circumference, the main body comprising:

5 a plurality of first helical segments having a circumferential dimension that expands when the stent is expanded and contracts when the stent is crimped; and

10 a plurality of second helical segments having a circumferential dimension that expands when the stent is expanded and contracts when the stent is crimped;

15 wherein, when the stent is crimped, a portion of one of the first helical segments and a portion of another of the first helical segments nestle between a portion of one second helical segment and a portion of another second helical segment; and

20 wherein, when the stent is crimped, portions of a second helical segment nests within portions of a first helical segment.

25 2. The stent of claim 1, further comprising a first endzone and a second endzone, the endzones straddling the main body, and wherein the endzones and the first expandable elements and the second expandable elements expand at different rates when the stent is subjected to a radial expansion force.

30 3. The stent of claim 2, wherein the endzones comprise square outer edges.

4. The stent of claim 2, wherein the first helical segments form a first helical angle and the second helical segments form a second and different helical angle.

25 5. The stent of claim 4, wherein the first helical segments are comprised of a plurality of first expandable elements and wherein the second helical segments are comprised of a plurality of second expandable elements, and wherein the second expandable elements expand at a faster rate than the first expandable elements.

30 6. The stent of claim 5, wherein, when the stent is subject to a radial expansion force, the main body expands at a uniform rate.

7. The stent of claim 6, wherein the stent has a crimped diameter of less than 2.0 mm and an expanded diameter of greater than 12mm.

8. The stent of claim 6, wherein the first expandable elements are comprised of a plurality of substantially R shaped structures.

9. The stent of claim 8, wherein the R-shaped elements share a common filament element and are inversely oriented to one another.

10. The stent of claim 9, wherein the second expandable elements are comprised of a plurality of linear segments joined together by curved segments.

5 11. The stent of claim 10, wherein the second expandable elements are substantially Z-shaped

12. A balloon expandable cylindrically shaped stent having a geometry that allows the stent to be crimped onto a delivery device, the stent comprising: a plurality of first expandable elements, the first expandable elements being expandable in a circumferential direction, the circumferential direction being parallel to the circumference of the stent;

10 a plurality of second expandable elements, the second expandable elements also being expandable in the circumferential direction;

15 a plurality of first struts for joining the first expandable elements together to form a plurality of first helical segments and for joining the second expandable elements together to form second opposing helical segments, each first strut joining two first expandable elements and joining two second expandable elements.

20 wherein, when the stent is crimped, a portion of one of the first expandable elements nests within a portion of another the same first expandable element.

13. The stent of claim 12, wherein, when the stent is crimped, portions of two first expandable elements nestle between a portion of one of the second expandable elements and a portion of another second expandable element.

25 14. The stent of claim 13, wherein the first helical segments are oriented at a first helical angle and the second helical segments are oriented at a second and different helical angle.

15. The stent of claim 13, wherein the first helical segment has a total filament length differs from that of the second helical segment.

30 16. The stent of claim 13, further comprising square outer ends.

17. A stent having a generally cylindrical main body, the main body comprising:

a plurality of helical segments, at least one helical segment crossing another helical segment; and

wherein the stent has a crimped radius and an expanded radius that is 3-6 times the crimped radius.

18. The stent of claim 17, wherein the helical segments contract and expand in a direction parallel to the circumference of the main body when the stent is crimped and expanded.

5 19. The stent of claim 18, wherein at least one helical segment is comprised of a plurality of R-shaped filaments.

20. The stent of claim 18, wherein at least a portion of one helical segment nestles between two other helical segments when the stent is crimped.

10 21. The stent of claim 20, wherein the stent is manufactured from a tube having a diameter of between 0.03 to 0.500 inches.

22. The stent of claim 21, wherein the stent is manufactured by laser cutting the tube.

15 23. A balloon expandable stent having a geometry for crimping it to a delivery device, the stent comprising:

a plurality of contiguous filaments forming a plurality of circumferentially expandable helical segments, at least one helical segment having a first portion that nests within another portion of the same helical segment and a second portion that nestles between two other helical segments.

24. The stent of claim 23, wherein the stent has a crimped diameter and an expanded diameter 3-6 times the crimped diameter.

20 25. The stent of claim 24, wherein the stent, in its expanded state, has a stent to vessel ratio greater than approximately 15% .

26. A stent comprising:

25 a plurality of cells, each cell comprised of :

a plurality of first elements;

a plurality of second elements, wherein each first element is connected to two second elements and each second element is connected to two first elements, thereby forming a polygon, wherein when the stent is crimped at least a portion of one of the first elements nestles between portions of two second elements; and

30 a plurality of struts connecting one cell to another.

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27. The stent of claim 26, wherein the second elements expand at a greater rate than the first elements, and wherein the cells uniformly circumferentially expand.

28. The stent of claim 27, wherein the first element has at least a portion that is generally R-shaped.

29. The stent of claim 27, wherein the second elements are generally Z-shaped.

30. The stent of claim 28, wherein the cells are joined together by struts to form:

10 a plurality of first helical segments that are comprised of a plurality of first elements; and

15 a plurality of second helical segments that are comprised of a plurality of second elements.

31. The stent of claim 30, wherein the struts are integral parts of the first and second elements.

32. A stent comprising:

15 a plurality of first elements comprised of one or more generally R-shaped filament segments;

20 a plurality of second elements comprised of one or more generally Z-shaped filament segments;

25 a plurality of struts joining at least some of the first elements together to form one or more generally first helical segments and joining at least some of the second elements to form one or more generally helical second segments, wherein the struts are integral parts of the first and second elements.

33. The stent of claim 32, wherein the first and second elements and the struts are portions of the same contiguous piece of material.

34. The stent of claim 33, further comprising endzones.

35. The stent of claim 34, wherein the endzones are part of the same contiguous piece of material.

36. The stent of claim 35, wherein the first and second elements expand in a circumferential direction at different rates when the stent is subject to a radially expansive force.

37. The stent of claim 36, wherein the stent uniformly expands circumferentially when subject to a radially expansive force.